Claims

I claim:

1. A method of producing a spunbonded nonwoven fabric comprising the steps of forming a melt blend of at least one polymer and at least one antistatic agent, extruding said blend in the form of a plurality of filaments, directing the filaments through an attenuation device and drawing the filaments to orient them, depositing the filaments onto a collection surface to form a web and bonding the filaments of the web.

2. The method, according to claim 1, wherein the filaments comprise nylon, polyester, acrylic, polyethylene, polypropylene, polybutylene terephthalate, poly(trimethylene terephthalate), or polylactic acid polymers; or a combination of these polymers.

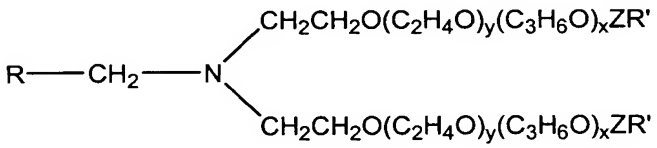
3. The method, according to claim 2, wherein the filaments comprise nylon 6; nylon 6,6; nylon 6,10; nylon 6,12; nylon 11; nylon 12; or nylon copolymers; or a combination of these nylon polymers.

4. The method, according to claim 1, wherein said method utilizes two or more melt blends of polymer.

5. The method, according to claim 1, wherein the attenuation device is a slot device.

6. The method, according to claim 1, wherein the attenuation device is a jet.

7. The method, according to claim 1, wherein said method utilizes an antistatic material comprising an agent selected from the group consisting of: saccharine; quarternary ammonium salts; homo- and co-polymers of epihalohydrin; N,N,-Bis(hydroxyethyl) alkylamine; chain extended polyoxiranes; aromatic sulfanomides; styrene polymers; the copolymerization product of ethylene oxide with a heterocyclic monomer or vinyl type monomer; low molecular weight polyether oligomers; carbon particles; trineoalkoxy amino zirconate; trineoalkoxy sulfonyl zirconate; and compounds of the general formula



wherein R is a C_{1-9} alkyl group or hydrogen, Z is a difunctional chain modifier group, R' is a C_{1-4} alkyl group or hydrogen and x and y are between about 10 and about 50.

8. The method, according to claim 7, wherein R is a C_{1-5} alkyl group or hydrogen, Z is a difunctional chain modifier group, R' is a C_{1-4} alkyl group or hydrogen and x and y are each between about 20 and about 40.

9. The method, according to claim 1, wherein said antistatic agent comprises ethylene oxide and at least one heterocyclic co-monomer.

10. The method, according to claim 1, wherein said antistatic agent comprises at least one polar organic compound having at least 5 carbon atoms and a compound having at least 3 heteroatoms.

11. The method, according to claim 10, wherein the antistatic material comprises one or more of the group consisting of polyethers, crown ethers, polyols, polyimines, polyamines, polymers derived from pyridine, macrocyclic aza compounds, polysulfides and polyphosphines, and salts of protic acids that are solvated or complexed in a polar organic compound.

12. The method, according to claim 1, wherein the static level measured at about one half inch below the outlet of the slot attenuation device is between about –2 kilovolt per inch and about 2 kilovolt per inch.

13. The method, according to claim 1, wherein the static level measured at about one half inch below the outlet of the slot attenuation device is between about –1 kilovolt per inch and about 1 kilovolt per inch.

14. The method, according to claim 1, wherein at least about 5% of the surface area of each filament is made of a nylon polymer.

15. The method, according to claim 1, wherein at least about 5% of the total surface area of all filaments is made of a nylon polymer.

16. The method, according to claim 1, wherein said method utilizes an antistatic agent that comprises polycaprolactum, a sulfonic acid, a C_{10}-C_{18} alkane, and sodium salts.

17. A method of producing a spunbonded nonwoven fabric comprising the steps of forming one or more melt blends of polymer and one or more antistatic agents either in a master batch or a base resin, extruding said blend or blends through

separate extruders into the form of a plurality of multicomponent filaments with the blend or blends of polymer and one or more antistatic agents forming a portion of the surface of the filaments, directing the filaments through an attenuation device, drawing the filaments to orient them, depositing the filaments onto a collection surface to form a web and bonding the filaments of the web.

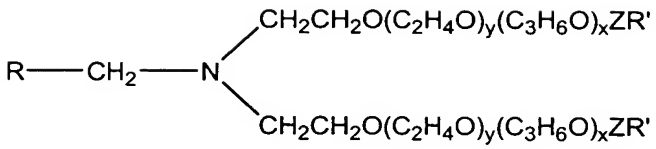
18. The method according to claim 17, wherein the filaments comprise nylon, polyester, acrylic, polybutylene terephthalate polyethylene, polypropylene, ethylene vinyl alcohol, polyvinyl alcohol, vinyl acetate, poly(trimethylene terephthalate), or polylactic acid polymers; or a combination of these polymers.

19. The method, according to claim 17, wherein the filaments comprise nylon 6; nylon 6,6; nylon 6,10; nylon 6,12; nylon 11; nylon 12; or nylon copolymers; or a combination of these nylon polymers.

20. The method, according to claim 17, wherein the attenuation device is a slot device.

21. The method, according to claim 17, wherein the attenuation device is a jet.

22. The method, according to claim 17, wherein said method utilizes an antistatic material comprising an agent selected from the group consisting of: saccharine; quarternary ammonium salts; homo- and co-polymers of epihalohydrin; N,N,-Bis(hydroxyethyl) alkylamine; chain extended polyoxiranes; aromatic sulfanomides; styrene polymers; the copolymerization product of ethylene oxide with a heterocyclic monomer or vinyl type monomer; low molecular weight polyether oligomers; carbon particles; trineoalkoxy amino zirconate; trineoalkoxy sulfonyl zirconate; and compounds of the general formula



wherein R is a C_{1-9} alkyl group or hydrogen, Z is a difunctional chain modifier group, R' is a C_{1-4} alkyl group or hydrogen and x and y are between about 10 and about 50.

23. The method, according to claim 22, , wherein R is a C_{1-5} alkyl group or hydrogen, Z is a difunctional chain modifier group, R' is a C_{1-4} alkyl group or hydrogen and x and y are each between about 20 and about 40.

24. The method, according to claim 17, wherein the static level measured at about one half inch below the outlet of the slot attenuation device is between about –2 kilovolt per inch and about 2 kilovolt per inch.

25. The method, according to claim 17, wherein the static level measured at about one half inch below the outlet of the slot attenuation device is between about –1 kilovolt per inch and about 1 kilovolt per inch.

26. The method, according to claim 17, wherein at least about 5% of the surface area of each filament is made of a nylon polymer.

27. The method, according to claim 22, wherein at least about 5% of the total surface area of all filaments is made of a nylon polymer.

28. The method, according to claim 17, wherein said method utilizes an antistatic agent that comprises polycaprolactum, a sulfonic acid, a C_{10}-C_{18} alkane, and sodium salts.

29. A single component, bicomponent or multicomponent spunbond process where the static level measured at one half inch below the outlet of the slot attenuation device is between about –2 kilovolt per inch and about 2 kilovolt per inch.

30. The processes, according to claim 29, wherein at least 5% of the surface area of each filament is made of a nylon polymer.

31. The processes, according to claim 29, wherein at least 5% of the total surface area of all filaments is made of a nylon polymer.

32. The processes, according to claim 29, wherein the static level measured one half inch or less below the outlet of the attenuation device is between about –1 kilovolt per inch and about 1 kilovolt per inch.

33. A non-woven fabric made with a process using one or more antistatic agents, wherein said fabric has lower static resistivity and faster static dissipation rates or static decay than a fabric made similarly without antistatic additives.